PHENIX Detector Electronics Racks and Time Of Flight Sector Fire Alarm System

procedure name

PHENIX Procedure No.PP-2.5.5.6-04

Revision: E **Date: 6/23/2016**

Hand Processed Changes

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6/23/16
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/Activity Manager

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REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	AUTHOR	APPROVED BY	CURRENT OVERSIGHT
A	First Issue	n/a	P. Giannotti	n/a	P.Giannoti
B	n/a	9/11/2003	P. Giannotti	P. Giannotti, J. Haggerty, W. Lenz, Y. Makdisi, J. Levesque	P. Giannotti
C	Reviewed and found to be fully up-to-date. No changes except rev letter and date.	12/17/2009	P. Giannotti	P. Giannotti, D. Lynch, R. Pisani	P. Giannotti
D	Reviewed and found to be fully up-to-date. No changes except rev letter and date.	1/25/2013	P. Giannotti	P. Giannotti, D. Lynch, R. Pisani	P. Giannotti
E	Reviewed and found to be fully up-to-date. No changes except rev letter and date.	6/23/2016	P. Giannotti	P. Giannotti, D. Lynch, R. Pisani	P. Giannotti

1. Purpose

   This test procedure will verify that the PHENIX "Notifier" fire alarm panel is operational and capable of sensing smoke in the designated detection zones. It is intended to be an inspection, testing, and maintenance document for the Notifier system which monitors for smoke in the Phenix Electronics racks and the ToF Sectors. The Notifier panel, under certain conditions, also activates a releasing circuit which opens an Inergen supply valve to admit Inergen gas into both Time Of Flight Sectors.

2. Responsibilities

   The Phenix Electronic Facilities & Infrastructure (EF & I) Group is responsible to perform this test in cooperation with the BNL Fire Alarm Group. Fire alarm technicians are required to be present for monitoring and re-setting fire panel 189 and 212 alarms .

3. Prerequisites

   - Only system specialists will implement this procedure (P.Giannotti, J.Haggerty, F. Toldo) and approved by Phenix and or CAD. Certain Safety System Interlock functions are required to be bypassed (disabled) while performing this procedure. Notify the liaison engineer for authorization to bypass trips and for access into the Phenix Bypass Cabinet

   - This procedure can only be performed during shutdown periods of the Phenix detector.

   - This procedure shall be performed as close as possible to the beginning of each Phenix detector run.

4. Precautions

   The use of a bypass on any system shall be analyzed for safety ramifications and may not be bypassed if the system is put in an unsafe state. Authorization from CA-D may be required for a bypass from the as configured state. Consult the liaison engineer for authorization.

Procedure

Notify the Phenix shift leader prior to commencing this procedure. The fire alarm bells and strobes will remain active. Prior to activating the alarm bells each time, make announcements on the Building 1008 complex PA system.

5.1 Battery and charger test. A battery and charger unit supply 24 volt power to the Notifier panel and are contained inside the panel.

5.1.1 Visually inspect batteries for corrosion or leakage. Check and ensure tightness of connections. Also, check for any bulges or distortions in the battery cases.

Caution: Prior to completing the next step, perform the following:

a) Enable trip bypass: TOF Sector 0, 2/2 High Smoke (switch #1-5) located in the Phenix Bypass cabinet by turning the switch to the on position.

b) Enable trip bypass: TOF Sector 1, 2/2 High Smoke (switch #2-1) located in the Phenix Bypass cabinet by turning the switch to the on position.

c) Disconnect the Inergen supply valve power wires inside the Notifier panel by pulling the plug connector on terminal block TB-7.

5.1.2 Interrupt AC power to the Notifier panel/charger by opening circuit breaker #26 in breaker panel DPA-2. Measure the battery terminal voltage while it is supplying load to the Notifier system. Replace the batteries if the voltage is less than 23.1 volts DC. Replace all batteries beyond 5 years old.

5.1.3 Restore AC power to the charger by re-closing circuit breaker #26 in breaker panel DPA-2. Verify restoration of green light and clearing of "Loss of power" display.

5.1.4 Disconnect the batteries from the charger by pulling the leads off the batteries.

5.1.5 Measure the individual battery voltages. Replace all batteries if any individual battery reads below 12.1 volts DC. Reconnect batteries to the system. Verify clearing of "Loss of battery" alarm.

5.2 Smoke Detector Zone Tests

There are 73 photoelectric smoke detector zones contained in electronic racks/enclosures in the Phenix experiment. There are 4 smoke detector zones contained in the TOF sectors. Refer to attachment 1 for a list of the zones. Test each zone by using the approved (Home Safeguards) smoke detector aerosol or trip each detector using a permanent magnet. Each zone will be displayed on the Notifier panel readout. Verify proper zone identification.

5.3 TOF Inergen Releasing Circuit Verification Test

The Time Of Flight sector electrically actuated Inergen valve will fire to release Inergen into the TOF sectors when both the A and B smoke detectors inside either sector sense smoke. This test will not verify the actual firing of the valve. It will test the function of the Notifier Fire Alarm panel to activate the releasing circuit output. This is verified through reading the correct polarity and value of the DC voltage present on the wire terminals which connect to the Inergen valve. The wires will be disconnected to the Inergen valve during performance of this test.

5.3.1 Reset all alarms indicating on the Notifier fire alarm panel. Ensure the plug connector on terminal block TB-7 remains disconnected. Verify that minus 2.4 volts DC exists on teminals B+ and B- of terminal block TB-7.

5.3.2 Trip the A and B smoke detector inside TOF sector 0 by using smoke spray or the smoke detector test magnet. Verify that plus 24 volts DC exists on terminals B+ and B- of terminal block TB-7.

5.3.3 Reset the Notifier panel alarms. Clear the Fire Alarm Panel of alarms. Again, verify that minus 2.4 volts DC exists on teminals B+ and B- of terminal block TB-7.

5.3.4 Trip the A and B smoke detector inside TOF sector 1. Verify that plus 24 volts DC exists on teminals B+ and B- of terminal block TB-7.

5.3.5 Reset the Notifier panel. ***Caution: Ensure A & B detector alarms have been cleared to avoid accidental trip of the Inergen system.***

5.4 Alarm Notification Device Test

This section will test the building alarm bells and strobe lights. It will also verify receipt of the building 1008 alarm (zone 31) at the BNL Fire House Alarm Panel.

5.4.1 On the Inergen supply header, actuate the Inergen pressure switch. Verify that the alarm bells and strobes are activated in the following 1008 areas:

a) 1008A Phenix Control Room
b) 1008A Counting House Rack Room
c) 1008A Utility Room Corridor
d) 1008A External Wall Of Building
e) 1008A Assembly Hall
f) 1008A Intersection Region (IR)
g) 1008E Office Trailers
h) 1008F Gas Mixing House

Also, verify that Zone 31 alarm is received at the BNL Fire House.

Return Phenix Inergen and Notifier Fire Alarm System to normal operation. Reconnect the ToF Inergen valve connector on TB-7 in the Notifier panel. Verify that all alarms on the panel are clear.

5.4 Return all system bypass switches to the off position. Verify that Phenix control room alarm “Phenix bypass active” number A 6-8 is clear.

5.5 Notify Phenix personnel that the test is complete.

Attachment 1

Phenix Detector Electronics Racks Smoke Detection Zones

1)	Zone 1	Rack WCB-1
2)	Zone 2	Rack WCS-11 LV
3)	Zone 3	Rack WCS-12 RICH FEM
4)	Zone 4	Rack WCS-13 HV
5)	Zone 5	Rack WCS-14 HV PbSc
6)	Zone 6	Rack WCN-11 RICH FEM
7)	Zone 7	Rack WCN-14 HV
8)	Zone 8	EMCAL W.0
9)	Zone 9	EMCAL W.1
10)	Zone 10	BB1 FEM (inboard)
11)	Zone 11	BB2 FEM (outboard)
12)	Zone 12	MVD
13)	Zone 13	ECB
14)	Zone 14	ECS-12 TEC FEM
15)	Zone 15	ECS-13 PbGl
16)	Zone 16	ECS-14 RICH FEM
17)	Zone 17	ECS-21 TOF FEM
18)	Zone 18	ECS-22 PbGl
19)	Zone 19	ECS-31 TEC FEM
20)	Zone 20	ECS-32 LV
21)	Zone 21	ECS-42 TOF HV
22)	Zone 22	ECS-43 HV
23)	Zone 23	ECS-44 HV
24)	Zone 24	ECN-13 RICH FEM
25)	Zone 25	ECN-11 TEC FEM
26)	Zone 26	ECN-14 PbGl LV
27)	Zone 27	ECN-21 PbGl LV
28)	Zone 28	ECN-22 TOF FEM
29)	Zone 29	ECN-31 LV
30)	Zone 30	ECN-32 TEC FEM
31)	Zone 31	ECN-41 TOF HV
32)	Zone 32	ECN-43 HV
33)	Zone 33	EMCAL E.0 A
34)	Zone 34	EMCAL E.0 B
35)	Zone 35	EMCAL E.1 A
36)	Zone 36	EMCAL E.1 B
37)	Zone 37	EMCAL E.2
38)	Zone 38	MuID.S HV
39)	Zone 39	MuID.S FEM
40)	Zone 40	ECS-11
41)	Zone 41	ECS-41
42)	Zone 42	ECN-12
43)	Zone 43	ECN-42

Attachment 1

Phenix Detector Electronics Racks Smoke Detection Zones (Cont'd)

44)	Zone 44	SMT-1
45)	Zone 45	SMT-2
46)	Zone 46	SMT-3
47)	Zone 47	WCN-12
48)	Zone 48	WCN-13
49)	Zone 49	EMCAL E.3
50)	Zone 50	EMCAL W.2
51)	Zone 51	EMCAL W.3
52)	Zone 52	WCB-2
53)	Zone 53	NMT-1 - Bottom
54)	Zone 54	NMT-2 - MID
55)	Zone 55	NMT-3 - TOP
56)	Zone 56	NMI-1 - HV
57)	Zone 57	NMI-2 - FEM
58)	Zone 58	FCAL.N
59)	Zone 59	FCAL.S
60)	Zone 60	ECN-44
61)	Zone 61	Level 1 Trig. PRR 3.1
62)	Zone 62	Timing Rack PRR 3.5
63)	Zone 63	Level 1 Trig. PRR 3.2
64)	Zone 64	DCM Rack 0 PRR 4.1
65)	Zone 65	DCM Rack 1 PRR 4.2
66)	Zone 66	DCM Rack 2 PRR 5.1
67)	Zone 67	DCM Rack 3 PRR 5.2
68)	Zone 68	DCM Rack 4 PRR 5.3
69)	Zone 69	DCM Rack 5 PRR 5.4
70)	Zone 70	TOF Sector 0 (Det A)
71)	Zone 71	TOF Sector 0 (Det B)
72)	Zone 72	TOF Sector 1 (Det A)
73)	Zone 73	TOF Sector 1 (Det B)